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A PROVISIONAL REVIEW

BY

HERBERT GROH

BOTANIST

DIVISION OF BOTANY

DOMINION EXPERIMENTAL FARMS

H. T. GÜSSOW

DOMINION BOTANIST

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GRANDE PRAIRIE WEEDS—A PROVISIONAL REVIEW

By HERBERT GROH

"A little learning," so we are given to understand, "is a dangerous thing." A little knowledge of Grande Prairie weeds is all that anyone, probably, can claim at the present time; but is it not wiser to use what light that knowledge can provide, even at the risk of some inadequacy, than to delay for ampler acquaintance which may come only after the loss of precious opportunities to forestall events? A smoldering spark quickly becomes a conflagration. Nor does a weed situation long remain stationary, particularly in a newly opened country, undergoing rapid development. Some day someone will prepare an exhaustive treatise on the subject that is opened up provisionally here, with facts voluminous and gravely altered it is to be feared; but facts now ascertained,—the truth, if not the whole truth,—should surely be made available at once.

A convenient opportunity was seized last October to spend an all too brief period in this splendid new empire of the north, with weed matters, not the appeal of the goodly land, (let us humbly confess it,) uppermost in mind. Suffice it to say its merits could not fail to be patent, even to the weed-jaundiced eye. Whether recalling the field, the forest, or town, the impressions retained are such as satisfy and bode well for days to come.

From daybreak of October 8, beginning a little past McLennan on the southern fork of the one railway serving the country, until Beaverlodge was reached in the evening, observations were made almost continuously from the moving train; and in particular during the brief time afforded at each stop, the fullest possible notes were taken of the weeds and other vegetation to be seen from the station platform and along sidings. From fifteen to twenty-five species of weedy plants could ordinarily be recorded accurately, and any others seen imperfectly, overlooked, or occurring beyond the range of vision, simply failed to enter the picture. The list made at the next station might, and if they were at all prevalent probably would, include them. Thus in the course of the day, by regular repetition of these lists, a mass of information was collected, which showed pretty truly the weed flora prevailing along the right of way at this season, and gave an inkling, such as it might, of that of the adjoining territory. After all, in this, as in most localities, farming land all more or less adjoins a railway, and receives an overwhelmingly large part of its weed influx *via* that route and the commerce it carries.

The following day and the forenoon of the 11th were devoted to making as complete a survey as was possible in the time, of a single area, the immediate neighbourhood of Beaverlodge. By foot excursions mostly, from the Experimental Station as a base, over near-by roads and fields, both upland and lowland, over unbroken prairie, wood land, and to the top of Saskatoon mountain, also into the town and over a stretch of the railway and the station yards, the exploration sought out most of the diverse conditions to be encountered. Some collections of less familiar species, and of weeds whose occurrence might be open to question, were made; but for the most part records are based on notes, not on specimens, as they would be in purely botanical surveys.

On October 10, through the unstinting hospitality of Mr. W. D. Albright, the enthusiastic Superintendent of the Dominion Experimental Station for the Grande Prairie District, a drive was enjoyed by automobile, from Beaverlodge to, and about the Pouce Coupé district in the Peace River Block of British Columbia. This provided an ideal means of gaining some conception of even newer country, as it is to be seen fifty or sixty miles beyond steel. Evidently, from what was observed, the much maligned railway is not alone in responsibility for the advent of weeds. The trail of the early explorer undoubtedly brought its

quota; in this instance grading for the railway that is projected but not yet laid, must have brought others, as every construction project does; and so the settler has no lack of adventitious as well as native weeds from the first.

The afternoon of the 11th was profitably spent driving over his route for the day, with Mr. Tatton, weed inspection supervisor in the district for the Alberta government; an official whose work I soon judged to be a real factor in stemming the surging tide of weed invasion. Enough was seen in the course of the several stages of our progress from Beaverlodge to Grande Prairie, of tactful and sympathetic dealing with farmers and threshers, of vigilance and firmness too, and of eagerness to learn what more he could of the weeds themselves, to convince me that an army of such men spread across the farming belt of Canada would be simply invaluable, and should be the unremitting quest of all governments concerned, until no part is left, as too commonly now, with only perfunctory inspection, or none at all.

Going over the field notes of such an expedition as just described, after some lapse of time, might be misleading in many respects were reliance to be placed too much on general impressions. Fortunately lists of weeds could be repeated frequently enough, in this case twenty-seven times across the district, to give their data some statistical value as regards prevalence. Actual importance or potential menace cannot be so simply recorded, and are more a matter for judgment. Even the prevalence is that only of the kinds of habitat chiefly traversed, and is unlikely to represent the open field, the railway, and the town-site, all with equal fidelity. Moreover it must be recognized that this particular survey was at a time of year when many weeds are quite past, or are recognizable only from their dried remains, although it was surprising how many species were still in flower and in good foliage. An unseasonable and heavy snow fall a couple weeks previously, and the frost to be expected by the end of threshing time, had left the vegetation still a pretty satisfactory reflection no doubt, of what would have been seen considerably earlier.

In what is to follow it is proposed to treat the various weeds recorded, in order of their prevalence, (not importance), as shown by compilation of the field notes taken under the limitations just pointed out. Comment in each case is to be upon such matters as their apparent seriousness here or in other parts of Canada, their habits, and their recognition when not generally known, or when liable to be confused with other species. Sometimes it may be possible to indicate significant points in connection with their control, but for the most part it must be accepted as a broad generalization that weeds are kept under control by good farming practices, such as are being inculcated by the local Experimental Station, the Agricultural Representatives and the Weed Inspector.

The first few weeds to come under review following out the sequence adopted, illustrate very well the statement that prevalence is not the sole, nor yet the chief, index of importance. It is not too much to say that some of the weeds at the other end of the list, on the strength of one or two records, are nevertheless among the most disturbing for the near future of the Peace River country.

Common Yarrow (*Achillea Millefolium* L.).—As in most parts of Canada where surveys have been conducted, yarrow was the most frequently recorded weed, only one list in the Grande Prairie survey failing to include it. This is owing partly to real abundance under a wide range of conditions, and partly also to its sufficient size and easy recognition. Although so widespread and abundant, it is not a particularly troublesome weed. It is a native, and, with some exceptions, native weeds are not the worst we have to contend with. As land is brought under efficient cultivation yarrow gives way to better plants. In addition to common yarrow, another species, *Achillea multiflora*, Hook., was twice recorded, being distinguished by its merely serrate, not dissected leaves and somewhat larger flower heads.

Prairie Rose (*Rosa* sp.).—None of the plants were closely studied, but this very common native rose is probably one of the same which yield rather reluctantly to cultivation in much longer settled parts of the prairies, because of deep, perennial rootstocks. Besides persistence it has coarseness to render it objectionable in a crop.

Great Willow-herb or fireweed (*Epilobium angustifolium* L.).—Native across Canada, and especially noticeable where recent fires or clearings have opened up a tract, this is one of the commonest weeds, though little harmful to the farmer. Its purple spikes are familiar to all.

Timothy (*Phleum pratense* L.).—Wherever timothy has been introduced as a crop it has shown itself capable of maintaining itself, and occasionally getting in the way.

Wild Barley (*Hordeum jubatum* L.).—The presence of this weedy native grass is sometimes, but not necessarily, an indication of alkaline soil conditions; its general distribution in this region would point, at all events, to no immediate soil acidity problem. Fields supporting a good crop growth are unlikely to be badly infested, but in grazing lands it becomes more abundant. It can be a serious nuisance by reason of the seeds and ripened awns working their way into the tissues of the mouth and eyes of horses, cattle and sheep.

Lamb's Quarters (*Chenopodium album* L.).—In the West also frequently better known as pigweed. An introduced annual weed, very prevalent in arable land, if allowed to seed freely, as it has every opportunity of doing under a system of extensive grain growing. A related weed of little importance, known as Strawberry blite (*Chenopodium capitatum* (L.) Asch.), and differing in its larger and bright red glomerules, was seen in the Experimental Station garden.

Western Rye Grass (*Agropyron tenerum* Vasey).—The inclusion of this valuable native grass in a weed list may be open to question. It is only when it is persisting where it is out of place that it needs to be suppressed. A few eastern records may indicate some tendency to spread.

Biennial Wormwood (*Artemisia biennis* Willd.).—This coarse, unsightly weed is native throughout the West, and has spread eastward to become one of the two chief wormwoods in those provinces. There should be no need for its occurrence to any serious extent in crops, yet it was all too commonly present.

Peppergrass (*Lepidium apetalum* Willd.).—A common weed of waysides, and of western grain fields as well, especially on light soils. The rosettes of leaves and the roots which carry it through the winter, may easily slip by the cultivation given when crops are merely "stubbled" in. Propagation is by seed alone.

Russian Pigweed (*Axyris amarantoides* L.).—It was rather surprising to find this quietly spreading weed quite so well established as it is in the Peace River district; it was recorded at well over half the stations. First noticed in Canada near Winnipeg in 1886, it has spread westward, and somewhat less rapidly eastward, until it is known now from most of the provinces. While chiefly a weed of waste places, it also invades crops, and being tall and bushy, crowds them considerably. Along roads it remains conspicuous late into the fall by reason of its characteristically whitened, persistent foliage and bracts. Being annual and a prolific seeder, prevention of seeding is of prime importance.

Upright Cinquefoil (*Potentilla monspeliensis* L.).—A common, but usually only a second rate weed, native and annual. It is frequently introduced into crops with timothy or clover seeds, and may take advantage of a poor stand of crop. Several other *Potentillas*, not occurring in the east, were also seen quite

commonly in unbroken land, but whether regarded locally as weeds I did not learn. The leaves of these plants are three to five or even nine "fingered", or in some species pinnate, and the flowers are yellow.

Wolfberry or Western snowberry (*Symphoricarpos occidentalis* Hook.).—Like the rose, this very prevalent low shrub may persist for some time after breaking, and in grazing lands pre-empt much space.

Common Horsetail (*Equisetum arvense* L.).—This, and wood horsetail (*Equisetum sylvaticum* L.), which latter was noticed but once, are common across Canada, and receive quite a variety of local names, suggested either by the bushy green vegetative stage, or by the earlier reproductive shoots, which lack green coloring matter, and bear cone-like spore producing organs at the tips of the bare stems. Common horsetail is a familiar cover of railway embankments where the substratum remains moist, and invades fields with faulty drainage. The horsetails have been found to be responsible for rather frequent cases of poisoning, especially of horses eating infested hay.

Shepherd's Purse (*Capsella Bursa-pastoris* (L.) Medic.).—Although introduced, shepherd's purse seems to be invariably present from the earliest history of a settlement. It is very common in the Grande Prairie district, its failure to be recorded more generally being attributable to its comparative insignificance at this season. It is represented at this time chiefly by its low-lying winter rosettes, all ready to get it under way in the early spring before the farmer is thinking of weeds; and from then until late fall, a succession of plants is producing seed in astonishing amount. The plant too, while possessing only a tap-root and rootlets, keeps a tenacious hold on the soil when weeded. Mr. Albright considers it as serious a pest as he has had to contend with thus far. The remedy, theoretically, is to prevent seeding, and secure germination of the seeds already in the soil as completely as possible, but unfortunately that cannot usually be completely enough.

Knotgrass (*Polygonum aviculare* L.).—Probably including one or two closely allied species. This is sometimes designated doorweed from its partiality for the hard-trodden dooryard; it is also to be seen along roads and prairie trails. As it covers surfaces that would otherwise be bare or sparsely covered with grass, it cannot be very strongly objected to.

Docks (*Rumex* spp., including curled dock—*Rumex crispus* L., and one or two native species). These were usually seen elsewhere than in crops, but in other parts of Canada trouble is often experienced in fields, where plowing and cultivation simply transplant the fleshy tap-roots of curled dock to resume growth but little harmed. The seed is a frequent impurity in commercial samples of inferior grade.

Vetches (*Vicia* spp.).—The species of vetch, in most cases, was not determined, but the American vetch (*Vicia americana* Muhl.), and probably the tufted vetch (*Vicia Cracca* L.) were the usual species. The value as forage usually outweighs any weedy propensities they may have at times. The same may be said of the wild peas (*Lathyrus*) which were seen.

Common Dandelion (*Taraxacum officinale* Weber.), and less frequently red-seeded dandelion (*Taraxacum erythrospermum* Andr.) are evidently the same ubiquitous nuisance in greensward and meadow here as everywhere. The strong, deeply anchored fleshy tap-root, and the parachuted fruits, ensure these Old World interlopers an entrance and hold that are very hard to combat. Fields that are under a systematic rotation of crops can be kept reasonably clean, but permanent grass, especially if not maintaining a strong close stand, will soon be foul with dandelion. Neither deep spudding, a laborious operation, nor chemical sprays, which need repeating oftener than most have patience for,

nor any other special treatment, has proven all that could be desired. Once a lawn or field is badly over-run it will be simpler in most cases to break up and clean for a fresh start, depending then on the best attainable sward to resist or delay reseeding from neighbouring sources.

Prairie Sage or Sage Brush (*Artemisia frigida* Willd. and *Artemisia gnaphalodes* Nutt.) appeared in about equal frequency, and not uncommonly in association. They are scarcely to be regarded as weeds of crops; but whatever may be their value on the ranges farther south, they would appear to be rather weeds than desirable constituents of the richer grazing lands of the north. They are perhaps an indication of over-grazing.

Awnless Brome Grass (*Bromus inermis* Leyss.).—Escaped from cultivation, and by means of its strongly creeping root system, able to persist strongly.

Wild Buckwheat (*Polygonum Convolvulus* L.).—Sometimes also called black bindweed from its habit of twining for support about the crop it infests. Being a field weed it is no doubt more prevalent than the notes would show, as was indicated also by the composition of screenings seen at the mill at Dawson Creek. As it is an annual, care to prevent its maturing in crops, and to avoid sowing of the seed with grain, along with the practice of a cropping system which allows of regular cleaning crops, is necessary to keep it in check.

Northern Bedstraw (*Galium boreale* L.).—A native plant that is seldom really weedy.

Pineappleweed (*Matricaria suaveolens* (Pursh) Buchenau.).—This weed has spread from the Pacific slope where it is indigenous, and is becoming common in waste places right through to the Atlantic. It frequents the same sort of habitat as chamomile or stinking mayweed in the east, and until its rayless green flower heads appear, it closely resembles that weed. The finely cut foliage is not however stinking, but rather distinctly pineapple scented.

Alsike Clover (*Trifolium hybridum* L.).—Well established and evidently better at home than either red or white Dutch clover. Only weedy when in the way, and not difficult to clean out.

Rough Hair Grass (*Agrostis hyemalis* (Walt.) BSP.).—A widespread but nowhere very serious weed.

Common Plantain (*Plantago major* L.).—This troublesome weed of lawns and fields, especially if rich and moist, was often enough seen to be rated as another of the permanent nuisances of this new country. Although only spreading by seed, it has a perennial short rootstock, and is almost in the same class as dandelion for tenacity.

Avens (*Geum* spp.).—Yellow Avens (*Geum strictum* Ait.) was seen but many of the plants seen may have been *Geum macrophyllum* Willd. The clinging hooked fruits of both these plants make them objectionable in pastures or around the home.

Tumbling Mustard (*Sisymbrium altissimum* L.).—This noxious weed of the prairie provinces was noticed half a dozen times, chiefly along the railway or in waste places. No doubt it will also thrive in grain fields here, as in other places. Its tumbling habit ensures the wide distribution of the numerous seeds.

Slender Nettle (*Urtica gracilis* Ait.).—Native and occurring along borders and in waste places. Its stinging hairs, causing a painful skin rash, render it an undesirable neighbour.

Thimbleweed (*Anemone cylindrica* Gray). One, or perhaps two of the thimbleweed species were met with. They are not weeds of tilled land.

Blue Bur or stickseed (*Lappula echinata* Gilib.).—Seen scattered along the railway mostly, but also no doubt in fields. Because of its burs, if for no other reason, it should be suppressed.

Sweet Clover (*Melilotus alba* Desr.).—Wherever this plant is grown as a crop, some infestation may be expected to remain in or about the field. Its eradication should present no great difficulties apart from the fact that some seed is almost sure to reach maturity, and there is always the chance of seed remaining over in the soil to germinate unawares in a succeeding crop. It must be admitted that, notwithstanding its merely biennial habit, sweet clover does become a dominant feature of the vegetation along roads, and on idle land, in many localities. Where lime is ample for it, little else remains oftentimes but its towering thickets fringing a roadway.

Ball Mustard (*Neslia paniculata* (L.) Desv.).—Some dense field infestations were seen, and there were indications of its being more prevalent than in most parts of the west, which is its stronghold. Propagation is by seed alone, and growing grain continuously will soon pollute the soil.

Indian Mustard (*Brassica juncea* Cosson).—This appears to be much the commonest of the mustards of this genus, at all events along roads and railways in this district. Only one doubtful record of wild mustard (*Brassica arvensis* (L.) Ktze.) appears in the notes, but it may be more in evidence at other seasons, when crops are growing. Wild mustard, if not Indian mustard also, needs to be prevented at all costs, from seeding down this new country.

Field Chickweed (*Cerastium arvense* L.).—A native perennial occurring in patches in pastures and unbroken land. The bright, white flowers, larger than those of other chickweeds, readily attract attention. Complaints of trouble in subduing it reach us occasionally.

Flixweed (*Sisymbrium Sophia* L.).—An introduced weed of the tansy mustard group, and closely resembling them in foliage, flower and fruit, and no doubt in weediness. Specimens from Beaverlodge and Halcourt were identified as this species, and appear to be the first definite records for northern, or perhaps all Alberta. Other notes made refer either to this, or to one or more of the native tansy mustards. These, like most mustards, are dangerous seeders, which are given every facility for rapid increase, as grain growing predominates.

Narrow-leaved Collomia (*Gilia linearis* (Nutt.) Gray).—A few times recorded, but doubtfully of importance as a weed. It is common in the West, but only occasional, perhaps adventive, in the East.

Hawkweeds (*Hieracium canadense* Michx and other native species).—Found occurring, but not aggressive weeds, like some of their allies in the East.

Fleabanes (*Erigeron* spp.).—Some of the western species abound in their season, and must displace a great deal of better herbage in grazing land.

False Flax (*Camelina microcarpa* Andr.).—Introduced with agricultural seeds, this pest of grain fields may be expected to become much more abundant than it appears to be yet, although its winter annual habit makes it more at home in fall than in spring wheat. It was noticed in three places.

Stinkweed or pennycress (also Frenchweed) (*Thlaspi arvense* L.).—Although seen at only a few points, one infestation in particular had so polluted a field, and according to Mr. Tatton, had gained such a hold in the neighbourhood of Halcourt, as to be the occasion of serious concern. There is also said to be severe infestation on some Pouce Coupé Farms. Experience in older sections would warrant going to almost any extremity to prevent its spread. Prevention of seed dispersal is the first essential. Diversification of crops to allow of suitable rotations, is to be encouraged. Every means at hand to ensure a strong,

even stand of whatever crop is being grown, is most desirable, as stinkweed is very quick to fill up any thin or patchy place in a field if any seed is present, growing lustily there, whereas the plants in a thick stand remain small and produce correspondingly little seed. Being both winter annual and annual, seeds will be maturing at almost any time of the year, and in the east, flowers have been seen to winter over, and go on to mature an early crop of seed, which indicates what unceasing vigilance is needed to keep it in check.

Couch grass (quack twitch, etc.) (*Agropyron repens* (L.) Beauv.)—This inveterate enemy of large portions of the eastern provinces is spreading in the West, and was found in patches at Beaverlodge and near Grande Prairie. It spreads both by seeds and by its tough, creeping rootstocks, which are capable of throwing up shoots wherever space can be found for their occupancy. Patches soon fill up closely, and in the course of a few years may even become sod-bound, shallow-rooted, and of stunted growth; but any segment of rootstock carried away from the patch by implements or otherwise, is instantly rejuvenated. Patches should be carefully dug up, or treated with some sterilizing agent such as fuel oil or salt, or with the newer chlorate herbicides, repeated until growth ceases to reappear. General infestations are usually handled by the "working out" method of tillage, preferably breaking up an old sod, with a shallow furrow, at the time when growth is well advanced toward flowering, (or after an early hay crop is removed); and then, if favoured with hot dry weather, the tearing up of the sods, and working of the rootstocks out into the sun is continued with whatever implements and operations will best serve the purpose. A bare summer-fallow or a cleaning crop the following year may be needed to complete a good job; and without ideal conditions a certain measure of control may be all that is accomplished.

This introduced couch grass is not to be confused with the so-called western couch grass or wheat grass (*Agropyron Smithii* Rydb.) which was more frequently seen and is likewise possessed of a strong creeping root system. The former has deeper green foliage, with some hairiness of the leaf sheaths, and a little smaller spikelets.

Canada Thistle (*Cirsium arvense* (L.) Scop.)—It was a distinctly agreeable experience to travel a day's journey by train through an agricultural region in Canada, and see this thistle but once. A plant was noticed at Spirit River, and another patch in the Pouce Coupé district was reported on good authority. Evidently it is scarce enough yet that a little effort to exterminate any patches that can be found, and a rigorous exclusion of contaminated seeds, roughage, etc., might hope to keep the Peace River country free of this scourge for some time yet. A native thistle, somewhat of the bull thistle type, but with curiously low habit, *Cirsium Drummondii* T. & G., I believe, was seen a few times, but not as a likely aggressor.

Canadian Blue Grass (*Poa compressa* L.) and Kentucky blue grass (*Poa pratensis* L.) were each noticed a couple of times and were probably over-looked the rest of the time. Although anywhere to be desired as pasture grasses, they sometimes involve some effort to clean them out of land to be used for other crops.

Showy Oxytrope (*Oxytropis splendens* Dougl.)—Allied to the loco weeds, but probably innocent of similar harm to stock. The loco weed of the prairies however is said to occur.

Orache (*Atriplex patula* L. or variety).—A weed of waste places, particularly of saline soils, somewhat similar to lamb's quarters, but usually less erect.

Wild Oats (*Avena fatua* L.)—Although seen only at Grand Prairie and Beaverlodge, this weed is known by those acquainted with the country, to be more prevalent. One farmer reported it as of serious concern to him now. Many

parts of the prairie provinces consider it second to none as a noxious weed; and to the extent that grain growing predominates in this new country, it may be expected to repeat its obnoxious depredations. Land known to be infested should not be allowed to mature any but an extremely early grain crop that can be cut before any wild oats ripens. The seed is peculiar in responding little, or not at all, to efforts to germinate it during the first fall, so every means should be provided for the freest possible germination of at least a couple lots of it in the spring, before the time for sowing a late crop.

Russian Thistle (*Salsola Kali* L. var. *tenuifolia* G.F.W.Mey.).—Noticed along the railway near Spirit River, and at Beaverlodge. This is a pest of the lighter soils of the West, and probably in the Peace River area it may, as in other parts of Canada, become of only local concern, and be confined for the most part to railway and waste lands. It is an annual and a tumble weed needing chiefly to be prevented from distributing its seeds.

Perennial Sow Thistle (*Sonchus arvensis* L.).—For upwards of fifty years this most heralded of all our weeds has been in eastern Canada, and during the latter half of this time practically all of its spread in western Canada has taken place. The trend of spread has been consistently northwestward from its commencement in the Red River valley of Manitoba, until now it is at least known in the Peace River district, and will soon be all too well known, unless the utmost vigilance is exercised to detect and promptly stamp out each incipient plague spot. Plants were seen at Wembley and Elmworth, and other localities are probably known to local officials. Greatest trouble is always to be expected in the heavier or better types of soils especially if they are inclined to be wet. Small new infestations should be treated, as in the case of couch grass, by careful up-rooting, or by means of chemicals, or if preferred by covering with tar paper until smothered. On larger areas the generally accepted principle is to starve out the rootstocks, by depriving them continuously of foliage, using the duckfoot cultivator to maintain a "black" fallow. Along with this goes of necessity, the elimination from badly infested fields, of grain crops, which would allow the seeds to mature and blow over clean fields; and the mowing of wild lands, lake margins and other undrainable tracts, which so often render other efforts on farms fruitless.

Hoary Cress (*Lepidium Draba* L.).—This adventive weed was seen at Grande Prairie, and had already been sent to us for identification from this neighbourhood in August, 1929, and from Teepee Creek in 1928. Both its strong system of perennial rootstocks, and experience with it in the prairie provinces where it has been spreading since it was first noticed in 1896, would warn that it should be regarded seriously. It is really a broad leaved peppergrass, but unlike the annual and biennial species, it must be fought by efforts to starve the root system.

Wormseed Mustard (*Erysimum cheiranthoides* L.).—If allowed this weed will multiply rapidly in grain crops, but it is not usually so difficult to keep in check as some of the other mustards. The seed is a common impurity in commercial farm seeds; and when present in feeds in quantity, makes them unpalatable and unwholesome to stock.

Androsace (*Androsace* spp.).—The rosettes of one of these pretty little native species occurred rather plentifully in one sandy garden, indicating that it may be included properly in a weed list.

Prairie Anemone, Pasque-flower or wild Crocus (*Anemone patens* L. var. *Wolfgangiana* (Bess.) Koch.).—This handsome spring flower is included in the list by reason of its injurious properties, due partly to its acidity, but sometimes to the accumulation of the hairs of the plant in felty balls in the stomach of sheep.

Everlasting or Cat's-foot (*Antennaria* spp.).—Native perennial herbs, forming patches often to the exclusion of better herbage in pastures.

Winter Cress (*Barbarea* sp.).—Indigenous here, but spread eastward as a weed, and in the apple district of Nova Scotia one of the prominent weeds.

Common Rye (*Secale cereale* L.).—In fields where it has been grown rye often remains as a mixture in a succeeding grain crop, and may straggle along in waste places.

Alfalfa (*Medicago sativa* L.).—Remaining along fence-rows and in fields where it has been grown, after imperfect plowing.

Water Parsnip (*Sium cicutaefolium* Schrank.).—Apt to be confused with the deadly water hemlock, but much less, if at all, poisonous. Both have umbels of white flowers, but whereas the leaves of this are simply pinnate, those of water hemlock are doubly compound. Water hemlock did not chance to be seen.

Larkspur (*Delphinium* sp.).—Some of the larkspurs in other regions have been responsible for tremendous losses of cattle and horses by poisoning, so local plants need to be held under suspicion until investigation proves such suspicions unfounded. Plants were seen only on the slopes of Saskatoon mountain, near Beaverlodge. Both these and other plants from the same locality, believed to be the poisonous *Aconitum*, were too old and weathered for complete identification.

Corydalis (*Corydalis aurea* Willd.) (Or *Corydalis sempervirens* (L.) Pers.).—Both persist sometimes in gardens and fields for a while after being brought under cultivation.

American or False Dragonhead (*Dracocephalum parviflorum* Nutt.).—To be found in recent clearings and in waste places; sometimes weedy.

Hare's-ear Mustard (*Conringia orientalis* (L.) Dumont.).—On the railway at Grande Prairie. In southern Alberta and throughout the West, it is steadily spreading as a weed of grain fields. The seeds are carried commonly in seed grain and flax. This is a weed which will not be of serious importance where mixed farming prevails.

Gumweed (*Grindelia squarrosa* (Pursh) Dunal.).—Noticed only at Beaverlodge, but no doubt plentiful. It is sufficiently aggressive to have established and maintained itself at many points east of its prairie home.

Sweet Grass (*Hierochloa odorata* (L.) Wahl.).—This grass, although seen only at Grande Prairie, is probably not rare, and where it does occur in farming land it gives much trouble. The roots are deep and perennial, with widely spreading rootstocks. Deep plowing when the ground is dry, before the ripening of seed in June, should be good tactics. A heavy seeding then to barley or rye, and another plowing late in the fall, are recommended. Opinions differ however, and we in the East have little experience with it.

Spear-leaf Goosefoot (*Monolepis Nuttalliana* (Schultes.) Engelm.).—A native weed, especially of saline soils, which may crowd grain crops that have got a late start. It is not a serious problem under ordinarily favourable conditions.

Various other native plants that are at times and in places regarded as weeds, were recorded, but do not seem of enough importance to be allowed to prolong this discussion. Better acquaintance with them in the district might change this estimate of them; and the same is quite possibly true of other plants seen but not thought of as weeds. Of greater consequence are those other species, some of them prevalent enough, no doubt, which nevertheless, in this hasty survey at the close of the season, escaped notice entirely. Of such, reported but not seen, are buttercup, ox-eye daisy, sheep sorrel, lady's thumb, common chick-

weed and chess. As intimated at the outset, this cannot presume to be more than a running commentary on weeds actually encountered; yet one, it is hoped, that will contribute something to a knowledge of the present weed situation. A brief decade hence, indeed half that interval, may have quite another tale to tell, which it will be illuminating then to ponder in the light of what is here preserved.

The Grande Prairie, and the entire Peace River district as it stands to-day, a comparatively unspoiled country, separated geographically and agriculturally from older Canada, has still an opportunity to withstand many of the ills which have settled as a continuing blight upon other communities. Weeds it already has, and it was never to be supposed that thorns and tares would be denied all entrance. But while more might have been done, much may yet be done to postpone evils that may be finally inevitable, and to resist stubbornly others that need not be inevitable.

The price of safety is not so burdensome as the penalty of indifference. Given reasonable safeguards of inspection and oversight, the one thing further that might be regarded as of paramount importance, is one that is to be earnestly desired as well for its own sake,—the building up of a sound and balanced agriculture, on the basis of permanent homes, served, as they will be, by transportation and other links with the world at large.

Others elsewhere, having allowed their lands to become weed-ridden while they pillaged its resources for quick profits, have in a measure, won back lost ground by a return to saner cropping and stocking, with all that is entailed in these; but retrenchment is a heart-breaking ordeal that Peace River farmers will do well to shun by enlightened foresight.

